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FOR STABILIZATION OF BIG HARVESTS IN THE VOLGA REGION

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In 1948, the USSR had a bountiful grain harvest which nearly attained the level of output of the 1940 harvest. Yet, a group of rayons in the Volga region found 1948 to be a difficult year, and are inclined to explain their difficulties as being due to the climate and drought. Their difficulties exist primarily, however, not as a result of the climate but because the people were not able to adapt themselves to climatic conditions existing during 1948.

Why was productivity lower in Kuybyshev Oblast last year? First of all, kolkhozes overlooked the problem of soil moisture. In some areas plowing was not completed; while in other areas which were plowed the necessary work to insure preservation of moisture was not undertaken. In other cases another mistake was made: prior to sowing, the plowed soil was deeply cultivated. Since the weather was extremely hot and windy, the soil which was deeply plowed in the spring dried out in 2-3 days.

As conditions exist in Kuybyshev Oblast, it is especially important to determine correctly the reasons for a lower harvest so that future destructive results can be prevented. In the spring of any year, all hands in the oblast are needed to harrow the soil as early as possible so as to create an upper layer of friable soil 1-2 centimeters deep. If the soil is harrowed, moisture evaporation is reduced.

A determining factor for good harvests in the Volga regions is early and rapid spring grain sowing. In Kuybyshev Oblast in particular, the

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sowing of summer grain crops must in no case be delayed.

Another important factor is the proper preparation of the soil prior to sowing. In a group of rayons in the steppe part of the oblast, soil cannot be deeply cultivated prior to sowing. This has been attempted and found to be a serious mistake which must not be repeated. In this sense, 1948 was extremely instructive. Although plowing and moisture preservation were carried out successfully in all the kolkhozes, the harvest was small. The reason was that the soil was deeply cultivated prior to sowing and dried out to a depth below that in which the seeds were sown. According to Academician V. R. Williams, seeds should lie on a firm base and should be covered by friable soil. The firm base holds moisture for the seeds so that they will come up quickly.

Deep cultivation of plowed earth in a rainy spring is beneficial. In a year such as 1948, however, deep cultivation only dries out the soil. Each member of a kolkhoz or brigade and each kolkhoz director should consider this fact beforehand. They must also consider thoroughly all technical agricultural measures so that the 1949 harvest will be better. To cite such technical measure: snow must be accumulated during the winter and as much snow water stored as is possible so that it may be utilized for plowed ground the next spring.

Another measure is to provide additional harrows to kolkhozes so that moisture preservation work can be carried out. It should always be remembered that this work must be carried out in 1-2 days. Otherwise all the labor spent on working the soil in the fall, spring, and summer may be wasted. It has become necessary to mobilize beasts of burden and to

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use them alongside tractors in order to carry out the work for moisture preservation.

Furthermore, every kolkhoz must strive to sow grains as early as possible so that early and vigorous shoots may be had. To have early shoots, vernalization of seeds is recommended. This method should be continued where it is already being utilized and introduced where kolkhoz workers can be taught the mechanics of this work. Properly conducted vernalization guarantees earlier and more vigorous shoots, earlier forming of ears and ripening of the grain, and in the final analysis, a larger harvest.

In vernalization, grains seeds should not be soaked too soon. It is better to begin late than too early in soaking. If the weather is bad and planting must stop, soaked seeds cannot be kept long since their germinative qualities will be lowered.

The inviolable rule set up by practice demands that vernalized seeds should be planted early rather than late even though vernalization is not complete. If seed vernalization has gone on only three days and the condition of the soil is ready for sowing, then; the seeds must be sowed immediately; seed vernalization will be completed in the soil.

Kuybyshev Oblast kolkhoz workers originated vernalization in the pre-war years and have used it on a large scale, having already sowed a million hectares of vernalized seeds. Other kolkhozes should learn the vernalization process from them.

Thus, in order to attain high and stable harvests in Kuybyshev Oblast in 1949, the following things must be done: 1) a supply of moisture for the soil must be accumulated during the winter by means of storing snow;

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and made friable prior to sowing; 3) sowing must not be delayed; 4) vernalized seeds must be used for sowing; and 5) the soaking of seeds for vernalization should not begin too early.

In Kuybyshev Oblast there is another reason for the smaller grain harvest. A group of kolkhozes have plots overgrown with wild oats which are very hardy and tend to drive out plants grown from vernalized seeds. for this reason, areas overgrown with wild oats cannot be sown with summer wheat as the wheat will be crowded out. In several areas in the Urals, for example in the Eastern Urals, it is possible to wait several days in the spring until the wild oats are up and then to cut them off before planting the wheat. This cannot be done in Kuybyshev Oblast, however, since it is too late to plant wheat after wild oats are cut. Therefore, the so-called spring wheat sowing in fields plowed in the fall is not carried out.

The only means of combatting the wild oat menace is to sow summer wheat in fields free of wild oats and to plant the overgrown fields with millet. The soil must be prepared for millet by storing snow water; preserving the moisture in the soil in the early spring, and then waiting until the wild oats come up. It is even better to recultivate the soil after five days. The wild oats begin to come up after 10-12 days. As soon as the shoots appear, the soil must be tilled with a grubber cultivator or other implement which will break up the soil and prevent drying out. After this operation, as soon as the shoots of wild oats are destroyed, it is necessary to harrow the soil. When it is time to plant the millet, the area must be cultivated and the millet seeds sown in wide rows. The millet

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will produce a large harvest, one as large as can be produced on a field free of wild oats.

Besides millet, other cultivated crops can be sown on fields overgrown with wild oats. For this reason, I recommend that in 1949 such plots be used for cultivated crops since the preparation of these plots prior to planting and cultivation between the rows is a considerable aid in combatting wild oats. For summer wheat, areas least overgrown with wild oats must be used.

How are the wild oats to be exterminated completely? This can be accomplished only by allowing the chernozem to lie fallow. Only 10-30 percent of wild oat seeds which have not spent the winter in the soil usually germinate immediately. The rest do not grow during the summer and seem to be dead, but in reality they are alive and are awaiting the spring to sprout. The seed capsule of wild oats is very tightly closed, so that air does not reach the seed until the capsule freezes. For this reason the seeds remain dormant and do not grow.

In the Volga region, the best method of fighting wild oats is by allowing the chernozem to remain fallow. In the fall, fields covered with wild oats must be plowed deeper so that the soil will freeze deeper. Then the seed capsule will be broken and the seed will sprout in the spring. Once they sprout, they must be given a chance to grow and must then be exterminated by plowing.

In spring cultivation of fallow chernozem for winter sowing in the dry areas as in fields plowed in the fall, about five days after the work on moisture preservation has been done, the fallow soil must be cultivated or plowed once again so that air can reach the entire plowed layer. This

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causes the wild oats to sprout.

Unless the soil is plowed or cultivated deeply in the early spring so that the soil receives its supply of air, wild oats will not come up either in the spring or summer.

It is known that in many wild summer plants, among them wild oats, give almost no shoots during the summer since their seeds do not germinate at that time. The explanation for this may be found in Darwin's theory of natural selection: if these plants sprouted in the summer, they would not be able to develop seeds by fall and so could not reproduce themselves. Even under the best conditions of stratification of fallow soil during the summer, i. e. reversing the new strata of soil and with them seeds of weeds, it will be difficult to combat such weeds as wild oats since only 10-20 percent of them will germinate. It is necessary to have as many wild oats possible sprout in the spring as they can then be exterminated by cultivating the soil.

Thus, the best means of combatting wild oats is by preserving moisture, plowing the fallow fields in the early spring so as to cause the wild oats to sprout, and then exterminating the wild oats by gang plows or grubber cultivators. Following this process, it is necessary to cultivate the soil for winter sowing as is done in a dry zone, i. e., without turning or drying out the soil.

The problem of exterminating wild oats is very important. For this reason, it is necessary to take measures to prevent wild oats from appearing in areas where they as yet do not exist. Seeds of grains, among which

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Seeds of wild oats are scattered, must not be sown, especially on fields free of weeds. In places where this is done a great deal of harm is caused, since wild oats once they establish themselves in the soil, spread quickly and are hard to exterminate.

In Volga kolkhozes where many fields are overgrown with wild oats, fallow land should be allotted to summer wheat. When we speak of combatting wild oats, it is expedient to provide fallow land for both winter and summer wheat. In fields lying fallow for summer sowing, wild oats must be exterminated in the spring by the method outlined above, followed by cultivation of the fallow stratified soil in the summer. During the course of the fall and winter the moisture content will be increased. In the early spring, the fallow field must be plowed and sowed with summer wheat.

Allowing summer wheat land to remain fallow can to a certain degree eliminate wild oats, but sowing winter grains in stubble kill it definitely. Although rye can be planted in the stubble of summer wheat, winter wheat is better for this purpose.

As large scale experiments in Siberia during the past seven years have shown, winter wheat can withstand much greater frosts than the frosts which occur in Kuybyshev Oblast. In Karaganda Oblast, as in the Siberian steppes, the winter is severe. But it has been shown that winter wheat sown on stubble by a disk sowing machine does not suffer at all from frosts. In these same areas, winter wheat, when sown in fallow soil did not die because it was unable to withstand the frost. However, friable soil containing moisture freezes in cold weather and in so doing cracks apart and breaks the life-sustaining roots and nodules thus causing the plant to die. If the soil is not plowed but remains firm, it does not crack and the plants endure the frosts very well.

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It has already been shown that winter wheat for stubble planting winters favorably in Siberia. Furthermore, in some areas of Siberia, even summer wheat planted in stubble in the beginning of October for experimental purposes endures the winter very well. Summer wheat, in contrast to winter wheat, must be sown later so that its plants will have only 1-2 leaves during the winter. Experiments have shown that after summer wheat has been sown for 3-5 years consecutively, by the 4th or 5th year the wheat strain will become hardier. In this way winter wheat with greater frost resistance will be developed.

It seems to me that frost resistant winter wheat can be planted in the Volga region. Knowing the yearly good, and even excellent, wintering of winter wheat in Siberia, it would be wrong to assume that winter wheat cannot be sown in the steppe regions, in the Volga region, and Kuybyshev Oblast, because the winters have frosts and little snow. This is shown by the fact that in the Karaganda Sovhoz, winter wheat has been sown on 2-3 hectares for the past seven years and has not died. Furthermore, the winters there are considerable colder and have less snow than winters in the Volga region.

The reason for only slight propagation of winter wheat in the Volga region is that means of cultivating it have not been found. It is now necessary to undertake the task in earnest and to find the right means as well as the most suitable varieties of winter wheat so that their propagation in the Volga region can be attempted.

Due to the fact that Kuybyshev Oblast is situated in a dry zone, the plan to fight the drought existing in the USSR should be undertaken here with special care and energy. The introduction and utilization of grass-

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field crop rotations and the planting of field-protecting forest belts is a task of gigantic importance for all the kolkhozes and sovhozes in the Volga region.

The first step in field-grass crop rotation must be the planting of grass seed, especially lucerne, and in some areas also clover. A sufficient quantity of lucerne and clover seeds and also grain grasses must be guaranteed. In the Volga region, a great deal can be done in field-grass crop rotation.

I can only recommend the following. Plots, overgrown with wild oats, plowed in the fall for planting in the spring might be profitably sown with summer lucerne. At the end of May, or the beginning of June, when wild oats come up after a good spring tilling, they must be exterminated. Then it is necessary to wait for rain and to sow lucerne mixed with barley by the usual sowing methods. However, it must be remembered that lucerne has small seeds which must not be permitted to become embedded.

It seems to me that sowing lucerne alongside grains planted in wide rows can be done successfully in the Volga region. In the year following such sowing, an excellent crop of lucerne will be had. Sowing of perennial grasses under cover of winter and summer crops should also be undertaken.

Now we turn to the planting of forests and the establishment of tree shelter belts.

Kolkhozes have forest belts which were planted during past years. My advice to kolkhoz workers, agronomists, and oblast directors is to examine carefully these belts planted five, ten, and fifteen years ago. That which is found to be beneficial should be studied and utilized and that which is not should be changed. For example, one may be convinced that if grass, sod,

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or quitch grass grows in the belts, then sooner or later the trees will wither away and die. In areas where the ground is not soddy, the trees grow well.

Examine the life of the forest. The forest does not permit the entry of sufficient light for sod or quitch. Quitch is the most dangerous enemy of forest trees since it chokes out trees, some as large as five meters high, wherever it appears. It is true, however, that in their natural state, trees are also able to resist quitch.

The wild growth of the steppes, especially quitch, sedge, and other varieties of grass plants, are the most deadly antagonists of forest trees. If the branches of trees meet and grow dense, then quitch, since it cannot grow without light, will die. Some think that the main reason forest plantings die because of quitch is that the quitch takes moisture away from tree roots. The roots of trees go down much deeper into the soil than those of quitch, however, and for this reason, lack of moisture is not the true reason. As an example we can take regions where there is a great deal of moisture and rain falls often, but as soon as quitch begins to appear around the trees, the trees are choked out. The reason is that quitch roots secrete a substance which is poisonous to the roots of trees and causes them to die.

In tree shelter belts it is not possible in any case to allow the soil to become overgrown with grass. If this is permitted even to a slight degree, the young trees die in 1-3 years. Therefore, repeated cultivation of young tree plantings in the tree shelter belts before they grow dense is necessary.

How can tree shelter belts be planted so that waste of labor and resources are reduced to a minimum?

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In 1949 scientific experimental institutes and the forestry managements of the steppe and forest steppe experimental areas pledged to produce specified quotas by the nest method. The All-Union Academy of Agricultural Sciences imeni V. I. Lenin is to direct this work.

What is the purpose of these experiments?

The essence of the proposal made by the academy to use the nest method to develop treeshelter belts for protecting fields may be summarized as follows: 1. It is recommended that oak and maple be planted by the nest method and that yellow acacia mixed with other brushwood be planted in rows; 2. Saplings during their first year of growth should be protected from all damage, primarily from wild steppe grass, by means of sowing various annual agricultural plants.

Thus, the best conditions for growing forest trees will be provided, and the waste of labor and resources in caring for the sowing and planting of forest belts will be decreased many times in comparison with the present methods used for planting forest trees in steppe regions.

If these experiments are successful -- we will know in 1-2 years -- then these means will be widely utilized in kolkhozes and sovkhozes.

The nest method for developing tree shelter belts is described in detail in the article "Experimental Sowing of Forest Belts by the Nest Method" published in the fourth edition of my book Agrobiology.

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